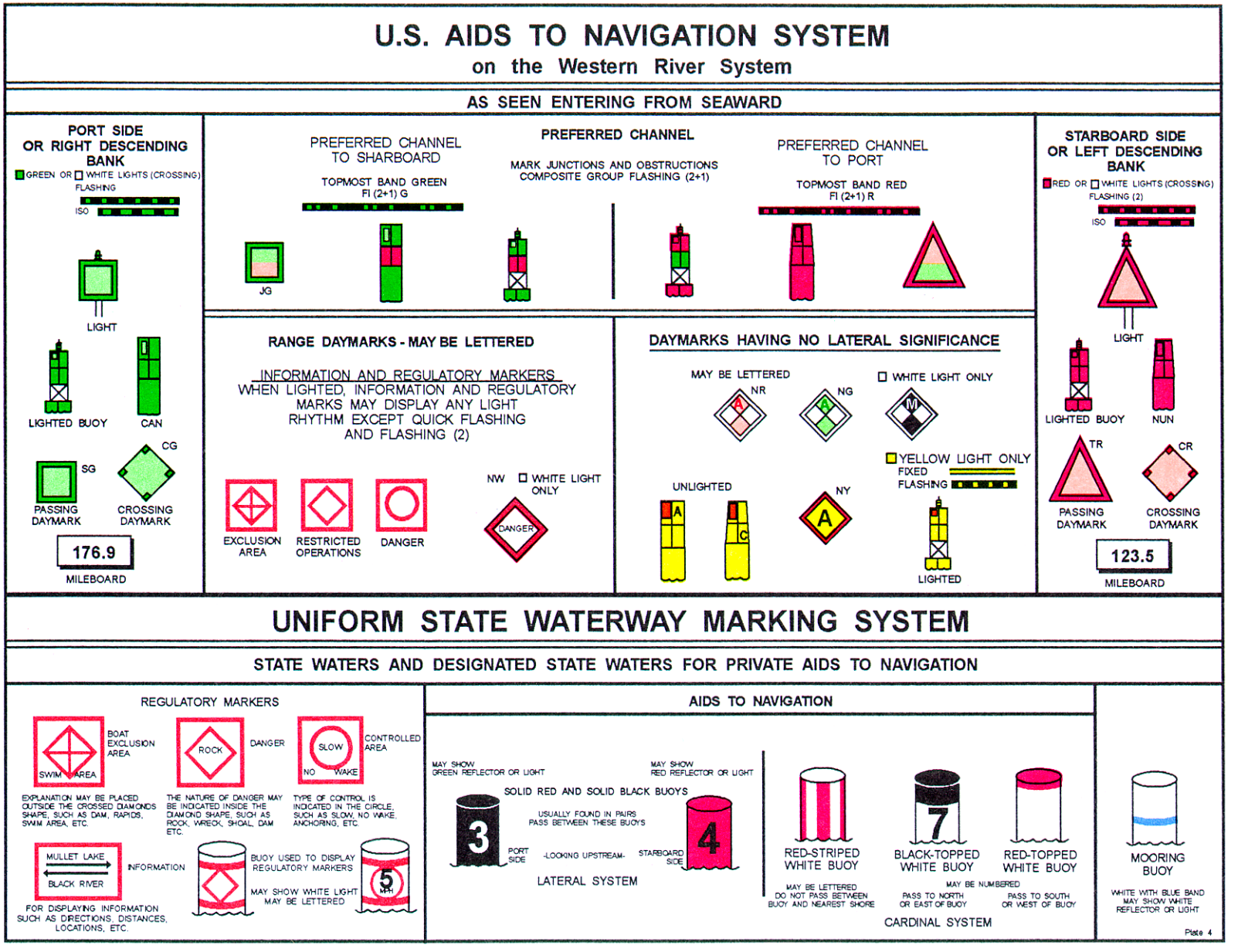


Figure 4-17. Aids to navigation as they appear on the western rivers of the United States.

THIS PAGE MUST BE PRINTED ON A COLOR PRINTER.

Characteristics of Aids To Navigation

Characteristics

The characteristics of ATONs include such things as color, light rhythms, cycle, number, and sound signal. In the pages that follow, we'll discuss these characteristics as they apply to the buoyage system used in the United States.

Solid Colors

During daylight hours, the color of an aid to navigation tells you which side of a channel the aid marks, regardless of whether the aid is a buoy, light, or daybeacon. At night, the color of a lighted aid serves the same purpose. Only ATONs with green or red lights have lateral significance. When proceeding in the conventional direction of buoyage in IALA region B, you may see the following ATONs:

Green buoys (and lights and daybeacons with **square**-shaped green daymarks) mark the port side of a channel when returning from seaward. Green buoys will only have green lights.

Red buoys (and lights and daybeacons with **triangular**-shaped red daymarks) mark the starboard side of a channel when returning from seaward. This is the "red right returning" rule you may have heard of. Red buoys will only have red lights.

Striped Buoys

Green and red (or red and green) **horizontally striped** buoys (daymarks for daybeacons and lights) are called **preferred-channel marks.** These aids are used to mark junctions (the point where a channel divides when proceeding seaward) or bifurcations (the point where the channel divides when proceeding from seaward). They may also be used to mark wrecks or obstructions that may be passed on either side. Here is how they are used in our buoyage system:

If the topmost band is **green,** keep the buoy to **port** to follow the preferred channel.

If the aid is a light or daybeacon and the topmost band is **green,** the daymarks will be **square**-shaped and the light color will be green regardless of the type.

If the topmost band is **red,** keep the buoy to **starboard** to follow the preferred channel.

If the aid is a light or daybeacon and the topmost band is **red,** the daymarks will be **triangular**-shaped and the light color will be red regardless of the type.

Safe Water Marks

Red and white vertically striped buoys (daymarks for daybeacons and lights) are called **safe-water marks.** They are used to mark a mid-channel, fairway, or landfall. Safe-water marks have white lights.

Black and red horizontally banded buoys are called **isolated danger marks.** They are used to mark an isolated danger that has navigable water all around it. Isolated danger marks have white lights.

Yellow buoys and beacons are called **special-purpose marks.** They are used to mark anchorages, dredging, and fishnet areas. These aids have yellow lights.

Nonlateral aids are lights and daybeacons that have no lateral significance in our system of buoyage. Daymarks for these aids are diamond-shaped and will either be red and white, green and white, or black and white. The light color will always be white. These aids are used primarily as landmarks for navigation.

Sound Signals

Background Information

A *sound signal* is a term used to describe ATONs that produce an audible signal designed to assist the mariner in fog or other periods of reduced visibility. Sound signals can be activated by several means, such as manually, remotely, or by a fog detector device. It should be noted, however, that in patchy fog conditions, a fog detector may not always activate the signal.

Sound signals are distinguished by their tone and phase characteristics. The tones are determined by the devices producing the sound, such as a horn, bell, or gong. Phase characteristics are defined by the signal's sound pattern, or the number of blasts and silent periods per minute when operating. In the case of fixed structures, sound signals generally produce a specific number of blasts and silent periods every minute; buoy sound signals generally do not because the sound signal is generated by wave action.

The characteristic of a sound signal can be found in column 8 of the *Light List.* For example, for Chesapeake Light (LLNR 355) it reads "Horn: 1 blast ev 30^{s} (3^{s} bt)." What this means is that 30 seconds is the time required for one complete cycle to occur. During this 30-second cycle, there are 27 seconds of silence and 3 seconds of blast. You can time this cycle with a stopwatch just like a light. Timing a sound signal is another method of positively identifying an ATON. Unless it is specifically stated that a sound signal "Operates continuously," or the signal is a bell, gong, or whistle on a buoy, it can be assured that the sound signal only operates during fog, reduced visibility, or adverse weather.

CAUTIONS TO OBSERVE IN USING SOUND SIGNALS: Sound signals depend upon the transmission of sound through the air. As ATONs, they have certain inherent limitations that you must consider. Sound travels through air in a variable and unpredictable manner. At times, these signals may be completely inaudible even when close by. At other times, they may appear to be coming from a direction quite different than the actual bearing of the signal source. Mariners should not rely on sound signals to determine their positions.

Intracoastal Waterway

Information

The Intracoastal Waterway (ICW) is a largely sheltered waterway, suitable for year-round use, extending some 2,400 miles along the Atlantic and Gulf Coasts of the United States. In general, it follows natural waterways.

ATONs along the ICW have some portion of them marked with yellow. Otherwise, the coloring and numbering of the ATONs follow the same system as that in other U.S. waterways.

So vessels may readily follow the ICW, special markings consisting of yellow triangles and squares are employed. When you are following the ICW from the north along the Atlantic Coast and west along the Gulf Coast, aids displaying yellow triangles should be kept to starboard; those aids displaying yellow squares should be kept to port, regardless of the color of the aid on which they appear. Nonlateral aids in the ICW, such as ranges, safe-water, and other nonlateral daymarks, will be identified by the addition of a yellow stripe instead of a triangle or square.

The conventional direction of buoyage in the ICW is generally southerly along the Atlantic Coast and generally westerly along the Gulf Coast.

Western Rivers

Aids to navigation on the western rivers of the United States--the Mississippi River and its tributaries above Baton Rouge, Louisiana, and on other certain rivers that flow towards the Gulf of Mexico--are generally similar to those on other U.S. waters, but there are a few differences that should be noted (see fig. 4-17).

ATONs are not numbered. Numbers on ATONs do not have lateral significance, but instead, indicate mileage from a fixed point.

Diamond-shaped crossing daymarks, red or green as appropriate, are used to indicate where the river channel crosses from one bank to another.

Lights on green aids show a single flash, which may be green or white. Lights on red aids show a double flash, which may be red or white. Isolated danger marks are not used.

This concludes or discussion on ATONs and the buoyage system. We now have information on the road signs of the nautical road. We can now take a look at the traffic laws, or as they are known, the Rules of the Road.

Rules of the Road

Background Information

As a Quartermaster, you are required to know how to operate your ship's sound signaling equipment. You must also be able to interpret whistle and bell signals as they apply to the rules of the road. The rules of the road are published by the Coast Guard in a booklet entitled Navigation Rules (COMDINST Ml6672.2B).

International Rules are specific rules for all vessels on the high seas and in connecting waters navigable by seagoing vessels. The Inland Rules apply to all vessels upon the inland waters of the United States and to vessels of the United States on the Canadian waters of the Great Lakes to the extent that there is no conflict with Canadian law.

The International Rules were formalized at the convention on the International Regulations for Preventing Collisions at Sea, 1972. These rules are commonly called 72 COLREGS. The Inland Rules discussed in this chapter replace the old Inland Rules, Western River Rules, Great Lakes Rules, their respective pilot rules, and parts of the Motorboat Act of 1940. Many of the old navigation rules were originally enacted in the last century. Occasionally, provisions were added to cope with the increasing complexities of water transportation. Eventually, the navigation rules for the United States inland waterways became such a confusing patchwork of requirements that in the 1960s several unsuccessful attempts were made to revise and simplify them.

Following the signing of the 72 COLREGS, a new effort was made to unify and update the various Inland Rules. This effort was also aimed at making the Inland Rules as similar as possible to the 72 COLREGS. The Inland Navigation Rules of 1980, now in effect, are the result. The International/Inland Rules contain 38 rules that comprise the main body of the Rules and five annexes which are the regulations. The International/Inland Rules are broken down in parts as follows:

A-General
B-Steering and Sailing Rules
C-Lights and Shapes
D-Sound and Light Signals
E-Exemptions

Steering and Sailing Rules

Information

In this portion of the chapter a short discussion of the steering and sailing rules will be presented, but the majority of our discussion will be about part D, which contains the requirements for sound signals.

You must understand the steering and sailing rules and be able to apply them to various traffic situations. Although all rules of the road are important, the steering and sailing rules are the most essential to know to avoid collision. The risk of collision can be considered to exist if the bearing of an approaching vessel does not change appreciably.

NOTE: When you are approaching a very large vessel, or when you are in close quarters, a bearing change alone does not necessarily mean that a collision cannot happen.

Figures 4-18, 4-19, and 4-20 illustrate the three situations in which the danger of collision might exist: head-on, crossing, and overtaking. The illustrations and the following summary will help you learn the rules and the appropriate actions to take.

Head On

When two ships meet head on, or nearly so (fig. 4-18), each ship must change course to starboard and pass port-to-port. In international waters, a whistle signal is sounded only when a course change is actually made. If the meeting ships are already far enough off each other to pass clear on their present courses, no signal is sounded.

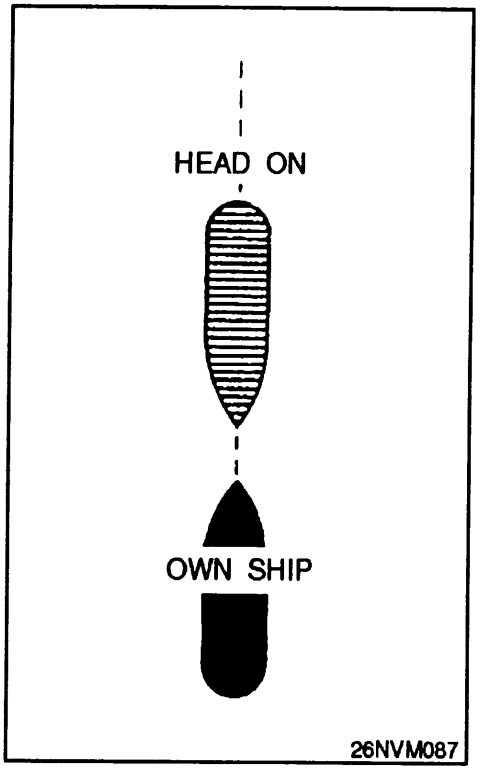
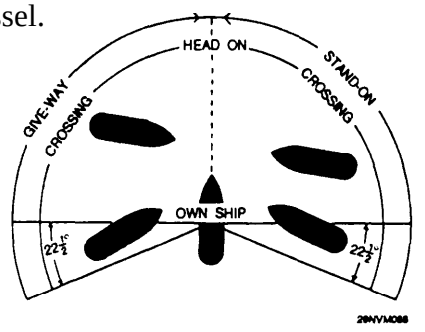


Figure 4-18. Ships in a head on situation.

Crossing

When two power-driven vessels are crossing and involve risk of collision (fig. 4-19), the vessel having the other to starboard must keep out of the way and will avoid usually by turning to starboard and passing astern of the other vessel or, if circumstances permit, speeding up and crossing ahead of the other vessel.



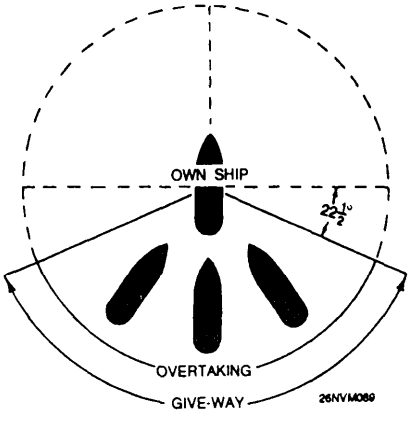
NOTE:
VESSELS TO BE CONSIDERED IN RELATION TO OWN SHIP ONLY.
COLLISION COURSE ASSUMED.

Figure 4-19. Two ships in a crossing situation.

A sailing vessel has the right-of-way over power-driven vessels except when the sailing vessel is overtaking, or when the power-driven vessel is engaged in fishing, is not under command, or is restricted in its ability to maneuver.

Overtaking

Any vessel overtaking another must keep clear of the overtaken vessel. An overtaking vessel is one that is approaching another vessel from any direction more than 22.5 degrees abaft its beam (fig. 4-20). When in doubt, assume you are overtaking and act accordingly.



NOTE:
VESSELS TO BE CONSIDERED IN RELATION TO OWN SHIP ONLY.
COLLISION COURSE ASSUMED.

Figure 4-20. Two ships in all overtaking situation.

Signals between Vessels

Information

Before we get into the requirements for signals, you must first understand the terms we will use.

Term	Definition
Vessel	The word vessel includes every description of watercraft including nondisplacement and seaplanes, used or capable of being used as a means of transportation.
Power-Driven Vessel	Any vessel propelled by machinery.
Sailing Vessel	Any vessel under sail, provided that propelling machinery is not being used.
Engaged in Fishing	Any vessel fishing with nets, lines, trawls, or other apparatus that restrict maneuverability, does not include a vessel fishing with trolling or other fishing apparatus that do not restrict maneuverability.
Not Under Command	Any vessel that, through some exceptional circumstances, is unable to maneuver as required by rules and is therefore unable to keep out of way of another vessel (i.e. broke down).
Restricted in Its Ability to Maneuver	Any vessel that, from the nature of its work, is restricted in its ability to maneuver as required by these rules and is therefore unable keep out of the way of another vessel.
Constrained by Draft	A power-driven vessel that, because of draft in relation to the available depth of water, is severely restricted in its ability to deviate from the course it is following (International Rules)
Under Way	Any vessel not at anchor, made fast to the shore, pier, wharf, or aground.
Length and Breadth	A vessel's length overall and greatest beam or width.

Term	Definition
In Sight of One Another	Only when one can be seen from the other.
Seaplane	Any aircraft that maneuvers on the water.
Restricted Visibility	Any condition in which visibility is restricted by fog, mist, falling snow, heavy rainstorms, sandstorm, or any other similar causes.
Inland Waters	The navigable waters of the United States shoreward of the navigational demarcation lines dividing the high seas from harbors, rivers, and other such bodies of waters of the United States, and the waters of the Great Lakes of the United States side of the International Boundary.
Demarcation Lines	Lines delineating those waters upon which mariners must comply with the 72 COLREGS and those waters on which mariners must comply with the Inland Navigation Rules. (The boundaries for the demarcation lines are listed in the back of the Coast Guard publication Navigation Rules.)
Whistle	Any sound signaling appliance capable of producing the prescribed blast and which complies with the specifications in Annex III of the International and Inland Rules. (When your ship was built and the whistle was installed, all of the specifications listed in Annex III were considered.) The term short blast means a blast of about l-second duration. The term prolonged blast means a blast of from 4- to 6-second duration.

Maneuvering and Warning Signals

Rules Regulating Sound and Light Signaling Equipment Required on Vessels

A vessel of 12 meters or more in length must be provided with a whistle and a bell. Vessels that are 100 meters or more in length must also have a gong. The tone of the gong cannot be confused with the tone of the bell. The bell and the gong must comply with the specifications listed in Annex III. As with the whistle, these specifications were taken into account when the ship was outfitted. A light may be used at night for signaling. The light must be, if fitted, an all-round white light, visible at a minimum range of 5 miles, and must comply with the provisions of Annex I to the International Rules.

A vessel of less than 12 meters in length will not be required to carry the signaling equipment described above, but must carry some efficient means of sound signaling.

Supplemental Light Signals

When vessels are in sight of one another, that is, a power-driven vessel under way, maneuvering as authorized or required by these Rules, they must indicate that they are maneuvering by the following signals on the whistle. Any vessel may **supplement** the whistle signals prescribed by light signals, repeated as appropriate while the maneuver is being carried out.

Situation	**Supplemental Light**
Inland: I intend to leve you on my port side. Int'l: Altering course to starboard.	one flash
Inland: I intend to leave you on my starboard side. Int'l: Altering course to port.	two flashes
Inland and Int'l: Operating astern propulsion.	three flashes

Understanding the Intentions of Another Vessel

Vessels in sight of one another are approaching each other and either vessel fails to understand the intentions or actions of the other, or is in doubt whether sufficient action is being taken by the other vessel to avoid collision, the vessel in doubt must immediately indicate such doubt by giving at least **five short, rapid blasts on the whistle.** Such signal may be supplemented by a light signal of at least five short, rapid flashes.

Vessels nearing a bend or an area of a channel or fairway where other vessels may be obscured by an intervening obstruction must sound one prolonged blast. Such signal must be answered with a prolonged blast by any approaching vessel that may be within hearing around the bend or behind the intervening obstruction.

Signals Required by Rule 34 of Navigation Rules

The following table lists the required sound signals required between vessels as stated in rule 34 of the *Navigation Rules.* The signals are made with the ship's whistle or the VHF radio. When using the VHF radio to exchange signals, use the words *1 whistle equals 1 short blast* and the words *2 whistles equal 2 short blasts.*

The International Rules do not require a reply from the receiving vessel except when being overtaken by another vessel, where if in agreement the overtaken vessel will sound 1 prolonged, 1 short, 1 prolonged, and 1 short blast in that order. The Inland Rules require the receiving vessel, if in agreement with the sending vessel, to sound the same signal in return. If, for any cause, the receiving vessel is in doubt of the proposed maneuver, the receiving vessel will sound 5 short blasts.

Signal	Condition	Meaning
1 short blast	Within l/2 mile of another vessel.	Inland: I intend to leave you on my port side.
	When in sight of each other.	Int'l: I am altering my course to starboard.
2 short blasts	Within l/2 mile of another vessel.	Inland: I intend to leave you on my starboard side.
	When in sight of each other.	Int'l: I am altering my course to port.
3 short blasts	Within l/2 mile of another vessel.	Inland and Int'l: I am operating astern propulsion.

Signal	Condition	Meaning
2 prolonged blasts followed by 1 short blast	Overtaking in narrow channel or fairway.	Int'l: I intend to overtake you on your starboard side.
2 prolonged blasts followed by 2 short blasts	Overtaking in narrow channel or fairway.	Int'l: I intend to overtake you on your port side.
1 short blast	Overtaking.	Inland: I intend to overtake you on your starboard side.
2 short blasts	Overtaking.	Inland: I intend to overtake you on your port side.
1 prolonged blast	Leaving a dock or berth.	Inland only: I am getting under way from a dock or berth.

Signals Required by Rule 35 of Navigation Rules

Rule 35 of the *Navigation Rules* gives the signals required by vessels during periods of restricted visibility. The VHF radio cannot be used to send signals as prescribed by rule 35. The following table lists the required sound signals required between vessels as stated in rule 35 of the *Navigation Rules.* These signals are the same for both the Inland and International Rules.

Signal	Condition	Interval
1 prolonged blast	Power-driven vessel making way.	Not more than every 2 minutes.
2 prolonged blasts; 2 seconds apart	Power-driven vessel under way but stopped and making no way.	Not more than every 2 minutes.
1 prolonged blast followed by 2 short blasts	Not under command; a vessel restricted in its ability to maneuver, under way, or at anchor; a vessel engaged in fishing whether under way or at anchor; a vessel engaged in towing or pushing a vessel	Not more than every 2 minutes.
Rapid ringing bell for 5 seconds followed by 1 short, 1 prolonged, and 1 short blast.	At anchor. **Note:** In vessels over 100 meters in length, the bell will be sounded near the bow followed by a 5-second gong signal from the stem.	Not more than every 1 minute.

Note: Rule 35 also covers signals for towing and special circumstances. Refer to the *Navigation Rules* for complete details.

Signals Used to Attract Attention

Distress Signals

International Rules and Inland Rules on signals to attract attention are almost identical. If it becomes necessary to attract the attention of another vessel, any vessel may make light or sound signals that cannot be mistaken for any signal authorized elsewhere in these rules, or may direct the beam of its searchlight in the direction of the danger in such a way as not to embarrass any vessel.

The following paragraph from the International Rules is not included in the Inland Rules.

Any light to attract the attention of another vessel will be such that it cannot be mistaken for any aid to navigation. For the purpose of this rule, the use of high-intensity intermittent or revolving lights, such as strobe lights, must be avoided.

There is no basis in the rules of the road for the popular notion that the national ensign, hoisted upside down, is a recognized signal of distress. No man-of-war would ever subject the colors to this indignity. But if you should see a private craft with the ensign hoisted upside down, it is probably in distress. Signals covered by the International Rules and Inland Rules are as follows (fig. 4-21):

Special Submarine Signals

The following signals, although not part of the rules of the road, are prescribed for submerged submarines in emergency situations involving rising to periscope depth or surfacing:

1. A white or yellow smoke flare fired into the air from a submarine indicates the submarine is coming to periscope depth to carry out surfacing procedures. Ships should clear the immediate vicinity but should not stop propellers.

2. A red smoke flare fired into the air from a submarine is a signal that the submarine is in serious trouble and will surface immediately if possible. Smoke flares of any color, fired into the air at short intervals, mean that the submarine requires assistance. All ships in the area should clear the immediate vicinity but stand by to give aid.

Signals Used to Attract Attention, Continued

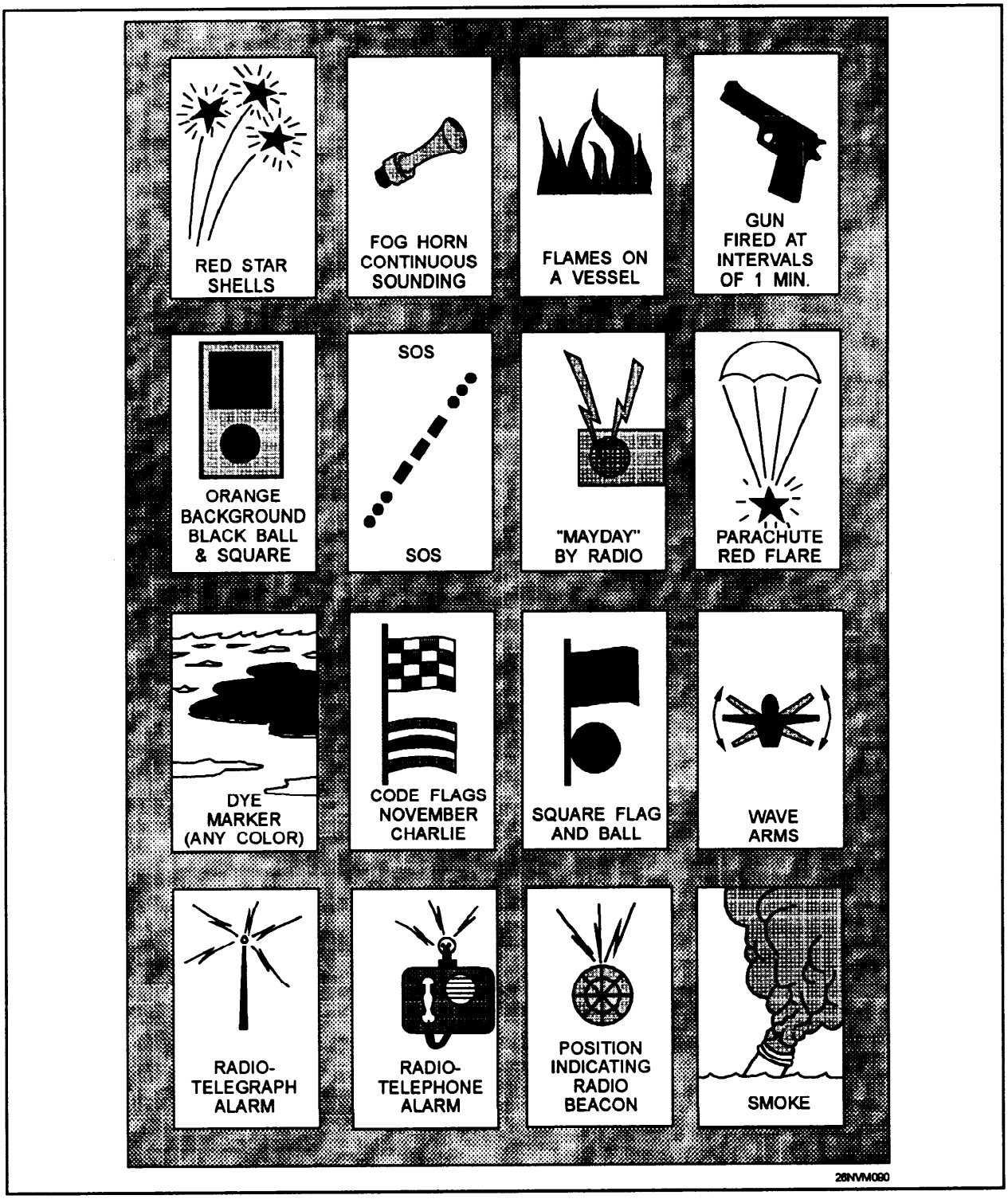


Figure 4-21. Distress signals.